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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.**	**Applicant(s)**	
	10/539,646	THIAGARAJAN, ARVIND	
	Examiner	**Art Unit**	
	MEKONEN BEKELE	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _18 February 2009_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-53_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-53_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _15 June 2005_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims1-53 are pending in this application.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority based on an application no. 1014/CHE/2003 filed in India on 12/15/2003. The certified copy has been filed in parent application 10539646, filed 10/03/2006.

Drawings

3. The drawings filed on 06/15/2005 are accepted for examination.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 1-19 rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing (Reference the May 15, 2008 memorandum issued by Deputy Commissioner for Patent Examining Policy, John J. Love, titled "Clarification of 'Processes' under 35 U.S.C. 101" – publicly available at USPTO.GOV, "memorandum to examining corp"). The instant claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. The method including the steps of: " transforming image data into bit plane"", "comparing each image element". The applicant has provided no explicit and deliberate definition

of “transforming” and “ comparing” to exclude steps completely performed mentally, verbally or without a machine. In order for a process to be “tied” to another statutory category, the structure of another statutory category should be positively recited in a step or steps significant to the basic inventive concept, and NOT just in association with statements of intended use or purpose, insignificant pre or post solution activity, or implicitly. The transform underlying subject matter to a different state or thing must satisfied three conditions: input (acquire) an image from a physical object, transformation the acquired image, and a depiction process of the transformed image. However, claims 1-19, are not addressing the acquiring condition and the depiction problem, i.e., is there a claimed depiction of the modified data or signal as an external (non- pure- data) representation of the physical object or substance, such as but not limited to a visual display. Therefore, the method claims 1-19 including the step of generating is of sufficient breadth that it would be reasonably interpreted as a series of steps completely performed mentally, verbally or without a machine.

Claim Rejections - 35 USC § 103

The following is a quotation of the 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained thought the invention is not identically disclosed or described as set forth in section 102 of this title, if the difference between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. *Claims 1,4-6,13, 20-25, and 52-53 are rejected under 35 U.S.C 103 as being unpatentable over Anastassiou; Dimitris(hereafter Anastassiou), US Patent No. 4,546,385 A, published in Oct. 8, 1985, in view of Malvar Henrique S. (hereafter Malvar), US patent No. 6771828 B1, filed on March 3, 2000.*

As to claim 1, Anastassiou teaches A method for compressing image data of an image **(Abstract: data compression apparatus and method),** comprising:

transforming the image data into a bit plane of first and second values **(Abstract, Fig. 1, claim 1, the data compression apparatus and method disclosed separates the graphics image into at <u>least first and second bit planes respectively</u> containing a most significant bit and at least significant bit for each pixel in the image indicating whether the pixel has an extreme intensity value or one of two intermediate intensity values);**

comparing each image element with a previous image element and if they are equal, recording a first value into a bit plane, and if they are not equal, recording a second value into the bit plane(**Figs. 2,3, claims 1 and 4, <u>comparing the bits in the first and second bit planes for each of the edge pixels to determine the binary state of each of the binary bits</u> generated, for indicating by the state whether each edge pixel has an extreme intensity value or an intermediate intensity value; and replacing said second bit plane with the indicative binary bits to compress the image data. The compressed image data is stored in the compressed image buffer storage unit 30. The comparing step is accomplished by performing a logical exclusive OR (XOR), and the out put of the XOR corresponds to the first and second value).**

However, it is noticed that Anastassiou does not specifically teach encoding repeating first and second values in the bit plane into bit plane index; wherein the compressed image is able to be decompressed using the bit plane index and the bit plane.

On the other hand the System and method for progessively transform coding digital data of Malvar teaches encoding repeating first and second values in the bit plane into a bit plane index(**Fig. 11, col. 13 lines50-60, general operation of the lossless adaptive coefficient**

encoder of FIG. 3A, which separates the coefficients into bit planes and encodes them using an adaptive run-length encoder. The bit planes are read from an input buffer that contains N numbers. The number of bit planes, bmax, is computed and a significance flag vector, sflg, is set to all zeros. Encoding begins with the most significant bit plane and a bit plane index variable bit is set equal to bmax);

wherein the compressed image is able to be decompressed using the bit plane index and the bit plane**(col.3 lines 37-44, the present invention also includes a method for decompressing a compressed bitstream by using adaptive run-length decoding to obtain transform coefficients from the compressed bitstream).**

It would have been obvious to one of ordinary skill in the art the time of invention was made to incorporate the system and the method for progressively transform coding digital data of Malvar into the data compressing method for graphic image of Anastassiou, because both Anastassiou and Malvar are directed to bit- plane based image compression (Anastassiou: Abstract, Malvar: col. 8 lines 10-15). Therefore, that would have been obvious to one of ordinary skill in the art the time of invention was made to incorporate the bit plane and bit plane index encoding technique of Malvar into the bit plane image comparison and comparison method of Anastassiou, because that would have allowed user of Anastassiou to compress images using the progressive image compression technique of Malvar, wherein the technique is efficient, simple, less expensive and easily implementable into existing hardware(col. lines 37-40)

At to claim 4, Malvar teaches, the transformation is a repetition coded compression horizontal transformation, repetition coded compression vertical transformation, repetition coded compression predict transformation, repetition coded compression adaptive transformation or a

repetition coded compression multidimensional transformation**(Abstract, col.6 lines 40-43system and method for compressing image data using a lapped biorthogonal transform (LBT) that includes, one DCT transformation (**horizontal or vertical transformation **) and two dimensions DCT transformation(** orthogonal transformation**), Lossless Adaptive Encoding)** or repetition coded compression predict transformation

Regarding claim 5, all claimed limitation are set forth and rejected as per discussion for claim 1.

As to claim 6, Anastassiou teaches the first value is a 1, and the second value is a 0(**Figs. 1 and 3, claim 4: the comparing step is accomplished by performing a logical exclusive OR (XOR), and the out put of the XOR which is 1 or 0 corresponds to the first and second value).**

As to claim 13, Anastassiou teaches a single mathematical operation is performed for each image element (**col. 5 lines 20, the logic equation E= (c XOR f) or (x XOR p) used in image comparison process).**

As to claim 20, Malvar teaches a data rearranging module to rearrange the transformed image data by causing elements of the image data to be repetitive (**Fig. 11 element 1165, the decision block 1165, encoding begins with the most significant bit plane and a bit plane index variable <u>bit is set equal to bmax</u>, and the process is repeated until <u>bit is equal to zero).</u>**

Regarding the remaining section of claim 20, all claimed limitation are set forth and rejected as per discussion for claim 1.

As to claim 21, Anastassiou teaches the number of elements repeated is dependant upon a predetermined level of image quality selected for the compressed image(**Abstract, At low resolution, bilevel images have poor quality at edges and a quality improvement is needed. Anastassiou specifically teaches a method separates the graphics image into at least first and second bit planes identifies edge pixels from the first bit plane indicating a black/white change, locates the edge pixels and generates at least a single bit for each edge pixel indicating whether the edge pixel has a maximum intensity value such as black or white or an intermediate gray intensity value).**

As to claim 22, Malvar teaches a source coder to receive the rearranged data as input(**Fig. 2 element 232 and 214, the adaptive entropy coding unit receives as an input the out put of coefficient reordering and blocking unit, wherein the out put of coefficient reordering unit is derived from the hierarchal lapped bi-orthogonal transformation of the input data.** The source coder corresponds to **adaptive entropy coding unit).**

As to claim 23, Malvar teaches the source coder comprises an arithmetic coder preceded by a run length encoder(**Fig. 2, 214, the adaptive entropy coding 214 includes arithmetic coder since the two of the most common entropy encoding techniques are Huffman coding and <u>arithmetic coding</u>. Further Malvar teaches method of reordered coefficients wherein the reordered coefficients are encoded using an adaptive run-length Rice-Golomb**

encoder. And the out put of the reordered coefficients are the input of the adaptive entropy encoder that include the arithmetic coding).

As to claim 24, Malvar teaches a camera for capturing at least one image**(col.17 lines 65, the present invention includes a digital cameras)** and for supplying digital data to the data transforming module **(col.8 lines 50-51, the digital camera with adjustable memory management model capture the a picture. The captured picture is inputted to the encoder (see Fig. 3)**; a reshaping block for rearranging the digital data into a matrix of image data values **(Fig. 13 element 1312, input matrix Q containing MXN quantized HLT coefficients is read. The first reordering occurs according to the matrix shown in FIG. 9, where, in this working example, N=8);** a processor for receiving the matrix of image data values and compressing the image data values to form compressed data (**Figs.3 and 4 shows the process of compressing the input data**); and a memory for storing the compressed data (**Fig. 7 element write buffer x containing hierarchical LBT coefficients to out put, wherein the hierarchical LBT is used to compress image data) .**

As to claim 25, Malvar teaches the camera is analog, and the system further comprising an analog-to-digital converter to convert the analog image into digital data **(Fig. 1, col.17 lines 65, the present invention includes a digital cameras. It is known that a digital camera has an analog to digital AD converter in its structure see for instant US Patent 4,502775 of Kuroki published in 1985).**

As to claim 52, Malvar teaches the predetermined level of image quality is user defined(**col. 5 lines 45-48, A user may enter commands and information into the personal computer 100 through input devices such as a keyboard 140 and pointing device 142**).

As to claim 53, Malvar teaches the method is used for an application selected from the group consisting of: medical image archiving, medical image transmission, database system, information technology, entertainment , communications applications, and wireless application, satellite imaging, remote sensing, and military applications(**col.17 lines 30-35, real world application: FIG. 14 is a simplified block diagram illustrating a real world implementation of the encoder of FIGS. 3A-3B and the decoder of FIGS. 4A-4B in a software application environment 1410 that handles image data. In particular, the software application environment 1410 includes a plurality of high-level application environments 1420 such as e-mail, word processing, spreadsheet, internet browser presentation and other types of applications).**

6. *Claims 26-40 are rejected under 35 U.S.C 103 as being unpatentable over Malvar; Henrique S. (hereafter Malvar), US patent No. 6771828 B1, filed on March 3, 2000, in view of Funnell et al.(hereafter Funnell), US Patent application No. 20040136457, published Jul. 15, 2004.*

As to claim 26, *Malvar teaches* A method for decompressing compressed data **(Figs.4A and 4B, col. 3 lines 38-42, the present invention also includes a method for decompressing a compressed bitstream)** comprising:

run-length decoding the compressed data(**Figs.4A and 4B,col. 3 lines 38-42, the method for decompressing a compressed bitstream by using adaptive run-length decoding to obtain transform coefficients from the compressed bitstream);**

reverse transforming the decoded data (**Fig. 4B inverse DCT Transformation**); and

rearranging the transformed decoded data into a lossless decompressed form compression(**Fig. 4B element 452, In this embodiment 450, the procedures performed by the inverse coefficient reordering processor 420 and the inverse coefficient reordering processor 442).**

However it is noted that Malvar does not specifically teach "arithmetically decoding the compressed data", **although Malvar suggests the use of arithmetic encoding in the wavelet based compression environment. Further, Malvar teaches encoding and decoding process that includes adaptive entropy encoding (col.7 lines 6-8). It is known that the two of the most common entropy encoding techniques are Huffman coding and arithmetic coding. Thus, Malvar teaches arithmetic coding, and inherently teaches arithmetically decoder, since Malvar disclosed both encoding and decoding process.**

On the other hand the Method and system for supercompression of compressed digital video of Funnell specifically teaches arithmetically decoding the compressed data **(Abstract, [0089], arithmetic decoding is performed in a step 1315, using a standard arithmetic decoding process).**

It would have been obvious to one of ordinary skill in the art the time of invention was made to incorporate the well known arithmetic decoding technique taught by Funnell in to the system and method for progressively transform coding digital image data of *Malvar,* because

both Funnell and Malvar are directed to digital image compression and decompression (Malvar: Abstract, Figs. 3 and 4, Funnell: Abstract), further both Funnell and Malvar implement DCT based compression and IDCT based decompression technique.

It would have been obvious to one of ordinary skill in the art the time of invention was made to incorporate the arithmetic coding technique of Funnell into Malvar, because that would have allowed user of Malvar to recompress previously compressed data (convert back to the original format)with little or no loss.

As to claim 27, Malvar teaches the reverse transformation is one dimensional including a horizontal variant, a vertical variant, or a predict variant(**col.6 lines 40-43**, **<u>one-dimensional</u> and two-dimensional DCTs are implemented in image compression process. Thus, one-dimensional and <u>two-dimensional</u> inverse DCTs (IDCts) are implemented in the decompression process).**

As to claim 28, Malvar teaches the reverse transformation is two dimensional such as a multidimensional variant (**col.6 lines 40-43**, **one-dimensional and <u>two-dimensional</u> DCTs are implemented in image compression process. Thus, one-dimensional and <u>two-dimensional</u> inverse DCTs (IDCts) are implemented in the decompression process).**

As to claims 29 and 35, Malvar teaches the rearrangement of the transformed decoded data comprises a reversible sort process (**Fig. 4 element 410, lossless adaptive decoder which is a reversible process)** and a last to first rearrangement (**Fig. 4 element 452, the inverse combined coefficient rearranging unit).**

As to claim 30, Malvar teaches the compressed data is image (**Abstract, col. 4 lines 35-38, a system and method for compressing image data using a lapped biorthogonal transform (LBT)).**

As to claim 31, Malvar teaches the image data originates from a photo, drawing or video frame (**col. 17 lines 44-47, the video input/output function 1440 provides the ability to display and receive video and image data from external sources. Fig 3A shows pictures as input data).**

Regarding claims 32-34, 36 and 37, all claimed limitation are set forth and rejected as per discussion for claims 26-28, 30 and 31 respectively.

As to claim 38, Malvar teaches a portion of the image data is compressed lossless while the remaining portion of the image data is compressed lossy (**col. 4 lines 24-26, Malvar teaches both lossless and lossy compression. FIG. 11 is a working example represented by a flow chart showing the general operation of the lossless adaptive coefficient encoder of FIG. 3A, and in the absence of quantization (which introduces lossy effects) the input data is recovered exactly by the inverse transform(col.11 lines 25-27))**

As to claim 39, Malvar teaches rearranged data is passed to an input of a source coder (**Fig. 2 element 232 and 214, the adaptive entropy encoding unit receives as an input the out put of coefficient reordering and blocking unit).**

As to claim 40, Malvar teaches the source coder comprises an arithmetic coder preceded by a run length encoder(**Fig. 2, 214, the adaptive entropy coding 214 includes arithmetic coder since the two of the most common entropy encoding techniques are Huffman coding and arithmetic coding**. **The reordered coefficients are encoded using an adaptive run-length Rice-Golomb encoder**, **and the out put of the reordered coefficients are the input of the adaptive entropy encoder**).

7. *Claims 2, 14-19 are rejected under 35 U.S.C 103 as being unpatentable over Anastassiou; Dimitris (hereafter Anastassiou), US Patent No. 4,546,385 A, published in Oct. 8, 1985, in view of Malvar Henrique S. (hereafter Malvar), US patent No. 6771828 B1, filed on March 3, 2000, further in view of Lee et al., (hereafter Lee), US Patent No.6535244 B1, published on Mar. 18, 2003.*

As to claim 2, Anastassiou teaches comparing each image element with a previous image element **(Figs. 2, 3, claims 1 and 4, comparing the bits in the first and second bit planes for each of the edge pixels);**

However, it is noted that both Anastassiou and Malvar do not teach "comparing each image element with a previous image element and if they are within a predetermined range of each other, modifying the image element to be equal to the previous image element; where repetition is increased to enable lossy compression of the image"

On the other hand the image stabilizing apparatus using bit-plane matching of Lee teaches comparing each image element with a previous image element and if they are within a predetermined range of each other, modifying the image element to be equal to the previous

image element; where repetition is increased to enable lossy compression of the image(**col. 2 lines 32-40, Lee specifically teaches steps of: extracting bit-planes from digital image information; selecting an optimum bit -plane among the extracted bit-planes; storing the optimum bit planes of a previous screen and a current screen; <u>comparing pixel values of the optimum bit-plane of a previous screen stored in the bit-plane memory and pixel values of the optimum bit-plane in a current screen to calculate correlation values between the pixels bit-planes</u>, and accumulating the calculated correlation values.** The predetermined range **corresponds to the predetermined threshold value that utilized to maintain or replace bit plane (col. 5 lines 20-25)).**

It would have been obvious to one of ordinary skill in the art the time of invention was made to incorporate Image stabilizing apparatus using bit-plane matching of Lee into the combined method of Anastassiou and Malvar, because all Anastassiou, Malvar and Lee are directed to bit- plane based image compression(Abstract).

Therefore, that would have been obvious to one of ordinary skill in the art the time of invention was made to incorporate the optimal bit plane and bit plane index encoding detection technique of Lee (Lee: col. 5 lines 5-10) into the combined method of Anastassiou and Malvar, because that would have allowed user of Anastassiou to obtain optimal bit plane using the optimal bit plane detector 202 of Lee (Lee: col. 5 lines 20-25).

As to claim 14, Lee teaches for the repetition coded compression predict transformation, a mapping value is used to replace repeating image elements (**Fig. 4, col. 5 lines22-32, Lee specifically teaches calculates an amount of movement of input image information between two screens by using bit-plane matching. If the absolute value difference**

between the selected bit plane conversion rate and the average bit plane conversion rate is equal to or less than the threshold value T, then the current <u>bit-plane is maintained</u>. However, if the absolute value is greater than the threshold value T in the step 44, the <u>bit-plane is changed into another one).</u>

As to claim 15, Lee teaches for the mapping value is a value that does not exist in the bit plane (**Fig. 4, col. 5 lines22-32, if the absolute value difference between the selected bit plane conversion rate and the average bit plane conversion rate is greater than the threshold value T in the step, the <u>bit-plane is changed into another one).</u>**

As to claim 16, Lee teaches the mapping value is a value that exists in the bit plane(**Fig. 4, col. 5 lines22-32, If the absolute value difference between the selected bit plane conversion rate and the average bit plane conversion rate is equal to or less than the threshold value T, then the current <u>bit-plane is maintained</u>)**.

Regarding claim 17, all claimed limitation are set forth and rejected as per discussion for claims 14 and 15.

Regarding claim 18, all claimed limitation are set forth and rejected as per discussion for claims 14 and 16.

Regarding claim 19, all claimed limitation are set forth and rejected as per discussion for claims 14 and 15.

8. *Claims 3, 8, 12, 46 and 50 are rejected under 35 U.S.C 103 as being unpatentable over Anastassiou; Dimitris (hereafter Anastassiou), US Patent No. 4,546,385 A, published in Oct. 8, 1985, in view of Henrique S. (hereafter Malvar), US patent No. 6771828 B1, filed on March 3, 2000, further in view of Funnell et al. (hereafter Funnell), US Patent application No. 20040136457, published Jul. 15, 2004.*

As to claim 3, Anastassiou teaches the comparison of the image elements **(Abstract, Fig.1**);

However it is noted that both Anastassiou and Malvar doe not specifically teach "the comparison of the image elements is performed in raster order, from left to right and then top to bottom" **although Anastassiou suggests a raster scan order wherein an edge bit can be generated for each edge pixel and stored for transmitted with the first bit plane data to indicate for <u>each pixel in raster scan order</u> (col. 4 lines65-67).**

On the other hand the Method and system for supercompression of compressed digital video of Funnell teaches the comparison of the image elements is performed in raster order, from left to right and then top to bottom([**0092], the encoder iterates over event matrix as the values would be read (i.e., raster iteration or left-to-right and top-to-bottom**).

It would have been obvious to one of ordinary skill in the art the time of invention was made to incorporate the raster scanning taught by Funnell into the combined method of Anastassiou and Malvar, because all Anastassiou, Malvar and Funnell are directed to digital image compression and decompression (Anastassiou: Abstract, Malvar: Abstract, Figs. 3 and 4,

Funnell: Abstract), further all Anastassiou, Malvar and Funnell implement the concept of bit plane in their image compression process, further more both Funnell and Malvar implement DCT based compression and IDCT decompression technique.

It would have been obvious to one of ordinary skill in the art the time of invention was made to incorporate the arithmetic coding technique of Funnell into the combined method of Anastassiou and Malvar, because that would have allowed user of Anastassiou to recompress previously compressed data (convert back to the original format) with little or no loss.

As to claims 8 and 46, Malvar teaches the repetition coded compression multidimensional transformation, comparison is in both horizontal and vertical directions (**using a lapped biorthogonal transform (LBT) that includes, one and two dimensions DCT transformation (col.6 lines 40-43)**), and a separate bit plane is used for each direction (**Fig. 11, col. 13 lines 53-56, the <u>bit planes are read from an input buffer x</u> (box 1110) that contains N numbers).**

As to claims 12 and 50, Funnell teaches storage in bit planes is in a matrix **([0095], Funnell specifically teaches information in a p-frame can be structured into several planes (i.e., "event <u>matrices</u>") with different levels of detail. A basic** A **basic event matrix. It is a two-dimensional bitmap where the two-dimensional bitmaps are 1-bit planes ([0095])**

9. *Claims 41-45 are rejected under 35 U.S.C 103 as being unpatentable over Malvar; Henrique S. (hereafter Malvar), US patent No. 6771828 B1, filed on March 3, 2000, in view of Funnell et al. (hereafter Funnell), US Patent application No. 20040136457, published Jul. 15, 2004, further in view of Anastassiou; Dimitris (hereafter Anastassiou), US Patent No. 4,546,385 A, published in Oct. 8, 1985.*

As to claim 41, however it is noted that both Malvar and Funnell do not specifically teach additional compression of the rearranged image data wherein each element is compared with a previous element and: (c) if they are equal, a first value is recorded; and (d) if they are not equal, a second value is recorded.

On the other hand the data compression method for graphics images of *Anastassiou teaches* additional compression of the rearranged image data wherein each element is compared with a previous element and: (c) if they are equal, a first value is recorded; and (d) if they are not equal, a second value is recorded(**Figs. 2,3, claims 1 and 4, comparing the bits in the first and second bit planes for each of the edge pixels to determine the binary state of each of the binary bits generated, for indicating by the state whether each edge pixel has an extreme intensity value or an intermediate intensity value; and replacing said second bit plane with the indicative binary bits to compress the image data. The compressed image data is stored in the compressed image buffer storage unit 30. The comparing step is accomplished by performing a logical exclusive OR on a most significant bit and a least significant bit of the intensity value of each of the edge pixels).**

It would have been obvious to one of ordinary skill in the art the time of invention was made to incorporate the technique of comparing bits in a first and second bit-plane for each pixels in an image of *Anastassiou (claim 1) in to the combined method of* Malvar and Funnell, because all Malvar, Funnell and *Anastassiou are directed to image compression. Therefore,* that would have been obvious to one of ordinary skill in the art the time of invention was made to incorporate the image a bit- plane based image comparison technique of *Anastassiou in to the combined method of* Malvar and Funnell, because that would have allowed user of Malvar to enhance both quality and compressibility of the compressed image (*Anastassiou*: Abstract)

As to claim 42, Anastassiou teaches each element is a pixel(**Regarding claim 42, all claimed limitation are set forth and rejected as per discussion for claim 41).**

As to claim 43, Anastassiou teaches the first value is a 1, and the second value is a 0(**Figs. 1 and 3, claim 4: the logic operation XOR).**

As to claim 44, Anastassiou teaches the first and second values are stored in a bit plane(**Regarding claim 44, all claimed limitation are set forth and rejected as per discussion for claim 41).**

As to claim 45, Anastassiou teaches a one-dimensional compression, a single bit plane is used to store the values **(col. 2 lines 55-60, identifying edge pixels from an encoding or decoding of the first bit plane of the image**).

As to claim 51, Anastassiou teaches a single mathematical operation is performed for each image element (**col. 5 lines 20, the logic equation E= (c XOR f) or (x XOR p) used in image comparison process).**

10. *Claims 7, 9,10,11,47, 48 and 49 are rejected under 35 U.S.C 103 as being unpatentable over Anastassiou; Dimitris(hereafter Anastassiou), US Patent No. 4,546,385 A, published in Oct. 8, 1985, in view of Henrique S. (hereafter Malvar), US patent No. 6771828 B1, filed on March 3, 2000, further in view of in view of Funnell et al.(hereafter Funnell), US Patent application No. 20040136457, published Jul. 15, 2004, further in view of Saiga et al., (hereafter Saiga), US Patent No. US 7031531 B1, filed on Aug. 14, 2000.*

As to claim7, Malvar and Funnell teach for the repetition coded compression horizontal transformation, repetition coded compression vertical transformation, repetition coded compression predicts transformation (**these limitations are discussed in claim 4 above**):

However, it is noted that Anastassiou, Malvar and Funnell do not specifically teach “single bit plane is used to store the values” although Anastassiou, Malvar and Funnell suggests multiple bit plane;

On the other hand the Image encoding device and method therefor of Salga teaches single bit plane is used to store the values(**Abstract: an image preprocessor (305) connected to the bit plane generator (303) to arrange bit data of the same position <u>forming a plurality of bit planes in close proximity to combine into a single bit plane</u>).**

It would have been obvious to one of ordinary skill in the art the time of invention was made to incorporate the technique of combining a plurality of bit planes in to a single bit plane using the bit plane generator (303) taught by Salga into the combined method of Anastassiou, Malvar and Funnell, because all are directed to a bit- plane based image compression.

It would have been obvious to one of ordinary skill in the art the time of invention was made to incorporate the bit planes merging technique of Salga into the combined method of Anastassiou, Malvar and Funnell, because that would have allowed user of Anastassiou, to obtain a higher compression rate using a hardware or software module that performs currently-available image compression processing (**Salga: Abstract**)

As to claims 9 and 47, Salga teaches the bit-planes for the horizontal and vertical directions are combined by binary addition to form a repetition coded compression bit-plane **(Abstract, col.3 lines 5-8, Salga is directed to binary image compression, thus the process of combining a plurality of bit planes into a single bit plane is carried out using binary addition).**

As to claims 10 and 48, Salga and Malvar teaches the combining is by binary addition (**see the discussion of claim 6 above**) only the second values being stored for lossless reconstruction of the image (**Fig. 4, Malvar teaches lossless reconstruction storing only one value is a design choice).**

Regarding claims 11 and 49 all claimed limitation are set forth and rejected as per discussion for claims 4 and 7.

Contact information

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Mekonen Bekele whose telephone number is 571-270-3915. The examiner can normally be reached on Monday -Friday from 8:00AM to 5:50 PM Eastern Time.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor AHMED SAMIR can be reached on (571)272-7413. The fax phone number for the organization where the application or proceeding is assigned is 571-237-8300. Information regarding the status of an application may be obtained from the patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR.

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